Sequence Listing

<110> Prof. Dr. Flügge, Ulf-Ingo

<120> DNA-Sequences, which code a glucose-translocator,
      Plasmids, Bacteria, Yeasts and Plants containing
      This Tranlocator

<130> plastidic glucose transporters

<140> 09/719,168
<141>

<150> 5652952
<151> 1999-06-13

<160> 6

<170> PatentIn Ver. 2.1

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<213> Zea mays

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<222> (1631)..(1874)

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tcg tgg agc ggc gat cgg aga ttg ccg gcg gtc aac ccc tgc agc gtg   97
Ser Trp Ser Gly Asp Arg Arg Leu Pro Ala Val Asn Pro Cys Ser Val
             20   25   30

cgg atg ccg acg ggc aac gat ggg tgg tgc gcc ggc ctg agg tcg cgg   145
Arg Met Pro Thr Gly Asn Asp Gly Trp Cys Ala Gly Leu Arg Ser Arg
         35   40   45

gcg gcg gat ctc gcc ggc ctc gag atg gcc aac ctg cgc ggc ggc gtc   193
Ala Ala Asp Leu Ala Gly Leu Glu Met Ala Asn Leu Arg Gly Gly Val
     50   55   60

ggg ggg ctc ttc cgc gcg agc ccg cgc tac ggg cgc ttg caa gcc acg   241
Gly Gly Leu Phe Arg Ala Ser Pro Arg Tyr Gly Arg Leu Gln Ala Thr
 65   70   75   80

gcg gca gtt gac cct gaa gat att cca ttg gag aag gtt caa gtt aaa   289
Ala Ala Val Asp Pro Glu Asp Ile Pro Leu Glu Lys Val Gln Val Lys
                 85   90   95

tcc tca gga cat gtt ctg cca tat gtt ggc gtt gct tgt ttg ggg gct   337
Ser Ser Gly His Val Leu Pro Tyr Val Gly Val Ala Cys Leu Gly Ala
             100   105   110

att ctg ttt ggt tac cat ctt ggt gtg gtc aat ggc gca ctt gaa tat   385

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Ile Leu Phe Gly Tyr His Leu Gly Val Val Asn Gly Ala Leu Glu Tyr
        115                 120                 125

ctc gcg aag gat ctt ggg att gct gaa aat gct gtc ttg cag ggg tgg    433
Leu Ala Lys Asp Leu Gly Ile Ala Glu Asn Ala Val Leu Gln Gly Trp
        130                 135                 140

gtg gtt agc aca tcc ttg gct ggt gca aca cta ggt tct ttt act ggg    481
Val Val Ser Thr Ser Leu Ala Gly Ala Thr Leu Gly Ser Phe Thr Gly
145                 150                 155                 160

ggt tct ttg gca gat aaa ttt ggg cgg aca aga aca ttc atc ctg gat    529
Gly Ser Leu Ala Asp Lys Phe Gly Arg Thr Arg Thr Phe Ile Leu Asp
                165                 170                 175

gca gtc cca ctt gct cta ggt gca ttc ttg agt gca aca gct caa gat    577
Ala Val Pro Leu Ala Leu Gly Ala Phe Leu Ser Ala Thr Ala Gln Asp
                180                 185                 190

atc cgc aca atg att att ggc cga ttg ctt gct gga att ggt atc ggg    625
Ile Arg Thr Met Ile Ile Gly Arg Leu Leu Ala Gly Ile Gly Ile Gly
        195                 200                 205

gtc tca tct gct ctt gta ccc ctt tac ata tct gag atc tca cca act    673
Val Ser Ser Ala Leu Val Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr
        210                 215                 220

gaa att cgt gga aca ctt ggt acc gtt aat caa ctt ttt att tgc att    721
Glu Ile Arg Gly Thr Leu Gly Thr Val Asn Gln Leu Phe Ile Cys Ile
225                 230                 235                 240

gga att ctt gca gct ttg tta gct gga ttg cct ctg gca gga aat cct    769
Gly Ile Leu Ala Ala Leu Leu Ala Gly Leu Pro Leu Ala Gly Asn Pro
                245                 250                 255

gcc tgg tgg agg aca atg ttt gga att gct gta gtt cca tcc att ctg    817
Ala Trp Trp Arg Thr Met Phe Gly Ile Ala Val Val Pro Ser Ile Leu
                260                 265                 270

ctg gct gta gga atg gcc ttt tcg cct gaa agc cct cgt tgg cta ttc    865
Leu Ala Val Gly Met Ala Phe Ser Pro Glu Ser Pro Arg Trp Leu Phe
                275                 280                 285

cag caa gga aag gtt act caa gca gaa tta gct gta aaa aga ctg tat    913
Gln Gln Gly Lys Val Thr Gln Ala Glu Leu Ala Val Lys Arg Leu Tyr
        290                 295                 300

gga aaa gaa atg gtt acc gaa att atg ttt gat ctg aga gct agt ggc    961
Gly Lys Glu Met Val Thr Glu Ile Met Phe Asp Leu Arg Ala Ser Gly
305                 310                 315                 320

caa agt tct tcg gag tcc gaa gcc ggc tgg ttt gat ctt ttc agc aag   1009
Gln Ser Ser Ser Glu Ser Glu Ala Gly Trp Phe Asp Leu Phe Ser Lys
                325                 330                 335

cgt tac tgg aaa gtt gtg agt gtg ggg gca gca ctg ttt ttg ttc cag   1057
Arg Tyr Trp Lys Val Val Ser Val Gly Ala Ala Leu Phe Leu Phe Gln
        340                 345                 350

cag ctt gct ggt ata aac gct gtt gta tat tac tct aca tcg gtg ttc   1105
Gln Leu Ala Gly Ile Asn Ala Val Val Tyr Tyr Ser Thr Ser Val Phe
        355                 360                 365
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cgt agt gca ggc att gca tct gat gtt gct gct agt gct ctt gtt gga    1153
Arg Ser Ala Gly Ile Ala Ser Asp Val Ala Ala Ser Ala Leu Val Gly
    370             375             380

gca gcc aat gtt ttt ggt act atg gtt gca tct tct cta atg gac aaa    1201
Ala Ala Asn Val Phe Gly Thr Met Val Ala Ser Ser Leu Met Asp Lys
385             390             395             400

caa gga agg aaa agc ctt ctg ata aca agc ttt tct gga atg ggt gct    1249
Gln Gly Arg Lys Ser Leu Leu Ile Thr Ser Phe Ser Gly Met Gly Ala
                405             410             415

tca atg cta ctc cta gca ttg tcc ttc acc tgg aaa gct ctg gca cct    1297
Ser Met Leu Leu Leu Ala Leu Ser Phe Thr Trp Lys Ala Leu Ala Pro
            420             425             430

tat tct ggt act ctt gct gtt gtt ggc act gtt ctg tac gtg ctg tca    1345
Tyr Ser Gly Thr Leu Ala Val Val Gly Thr Val Leu Tyr Val Leu Ser
            435             440             445

ttt gct cta gga gcg ggc cct gtt cca gcg cta ctt ctt cct gaa ata    1393
Phe Ala Leu Gly Ala Gly Pro Val Pro Ala Leu Leu Leu Pro Glu Ile
    450             455             460

ttt gcc tcg aga ata agg gcc aag gct gtc gca tta tct cta ggc atg    1441
Phe Ala Ser Arg Ile Arg Ala Lys Ala Val Ala Leu Ser Leu Gly Met
465             470             475             480

cac tgg gta tct aac ttt ttc att ggc ctg tac ttc ctg agt gtc gtg    1489
His Trp Val Ser Asn Phe Phe Ile Gly Leu Tyr Phe Leu Ser Val Val
            485             490             495

agc aag ttt ggg atc agc aac gtg tat ctg gga ttt gca tca gta tgt    1537
Ser Lys Phe Gly Ile Ser Asn Val Tyr Leu Gly Phe Ala Ser Val Cys
            500             505             510

gcc ctt gca gtt ctg tac ata gct ggg aat gtg gtc gag acc aag ggg    1585
Ala Leu Ala Val Leu Tyr Ile Ala Gly Asn Val Val Glu Thr Lys Gly
            515             520             525

aga tca ctt gaa gag att gaa agg gag cta agt gta gca gaa tga        1630
Arg Ser Leu Glu Glu Ile Glu Arg Glu Leu Ser Val Ala Glu
    530             535             540

tgtacttttg ctagtcatgc tgtggcgccg ttttggttat cgagaatgca accaagcgct  1690

caaccgagca tccttggacc tggagactct ttctagtttc atgtagtttt agaaataagc  1750

gaacggcaag agtaccaatc ttaggtgact tggtgtgggt tgtgtctgaa ataagtgaat  1810

tggattgtag aatttcagaa ataagtgaat tggattgtag aatttcaaaa aaaaaaaaaa  1870

aaaa                                                               1874


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<213> Zea mays

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 1               5               10              15
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            20   25   30

Arg Met Pro Thr Gly Asn Asp Gly Trp Cys Ala Gly Leu Arg Ser Arg .
            35   40   45

Ala Ala Asp Leu Ala Gly Leu Glu Met Ala Asn Leu Arg Gly Gly Val
        50   55   60

Gly Gly Leu Phe Arg Ala Ser Pro Arg Tyr Gly Arg Leu Gln Ala Thr
65   70   75   80

Ala Ala Val Asp Pro Glu Asp Ile Pro Leu Glu Lys Val Gln Val Lys
                85   90   95

Ser Ser Gly His Val Leu Pro Tyr Val Gly Val Ala Cys Leu Gly Ala
            100   105   110

Ile Leu Phe Gly Tyr His Leu Gly Val Val Asn Gly Ala Leu Glu Tyr
        115   120   125

Leu Ala Lys Asp Leu Gly Ile Ala Glu Asn Ala Val Leu Gln Gly Trp
    130   135   140

Val Val Ser Thr Ser Leu Ala Gly Ala Thr Leu Gly Ser Phe Thr Gly
145   150   155   160

Gly Ser Leu Ala Asp Lys Phe Gly Arg Thr Arg Thr Phe Ile Leu Asp
                165   170   175

Ala Val Pro Leu Ala Leu Gly Ala Phe Leu Ser Ala Thr Ala Gln Asp
            180   185   190

Ile Arg Thr Met Ile Ile Gly Arg Leu Leu Ala Gly Ile Gly Ile Gly
        195   200   205

Val Ser Ser Ala Leu Val Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr
    210   215   220

Glu Ile Arg Gly Thr Leu Gly Thr Val Asn Gln Leu Phe Ile Cys Ile
225   230   235   240

Gly Ile Leu Ala Ala Leu Leu Ala Gly Leu Pro Leu Ala Gly Asn Pro
                245   250   255

Ala Trp Trp Arg Thr Met Phe Gly Ile Ala Val Val Pro Ser Ile Leu
            260   265   270

Leu Ala Val Gly Met Ala Phe Ser Pro Glu Ser Pro Arg Trp Leu Phe
    275   280   285

Gln Gln Gly Lys Val Thr Gln Ala Glu Leu Ala Val Lys Arg Leu Tyr
    290   295   300

Gly Lys Glu Met Val Thr Glu Ile Met Phe Asp Leu Arg Ala Ser Gly.
305   310   315   320

Gln Ser Ser Ser Glu Ser Glu Ala Gly Trp Phe Asp Leu Phe Ser Lys
            325   330   335

Arg Tyr Trp Lys Val Val Ser Val Gly Ala Ala Leu Phe Leu Phe Gln
        340   345   350

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Gln Leu Ala Gly Ile Asn Ala Val Val Tyr Tyr Ser Thr Ser Val Phe
        355               360               365

Arg Ser Ala Gly Ile Ala Ser Asp Val Ala Ala Ser Ala Leu Val Gly
    370               375               380

Ala Ala Asn Val Phe Gly Thr Met Val Ala Ser Ser Leu Met Asp Lys
385               390               395               400

Gln Gly Arg Lys Ser Leu Leu Ile Thr Ser Phe Ser Gly Met Gly Ala
            405               410               415

Ser Met Leu Leu Leu Ala Leu Ser Phe Thr Trp Lys Ala Leu Ala Pro
        420               425               430

Tyr Ser Gly Thr Leu Ala Val Val Gly Thr Val Leu Tyr Val Leu Ser
        435               440               445

Phe Ala Leu Gly Ala Gly Pro Val Pro Ala Leu Leu Leu Pro Glu Ile
    450               455               460

Phe Ala Ser Arg Ile Arg Ala Lys Ala Val Ala Leu Ser Leu Gly Met
465               470               475               480

His Trp Val Ser Asn Phe Phe Ile Gly Leu Tyr Phe Leu Ser Val Val
            485               490               495

Ser Lys Phe Gly Ile Ser Asn Val Tyr Leu Gly Phe Ala Ser Val Cys
            500               505               510

Ala Leu Ala Val Leu Tyr Ile Ala Gly Asn Val Val Glu Thr Lys Gly
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Arg Ser Leu Glu Glu Ile Glu Arg Glu Leu Ser Val Ala Glu
        530               535               540


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Gly Arg Cys Arg Ser His Arg Val Arg Ala Ala Gly Glu Asp Ile Glu
  1               5                   10                  15

gat gca gca cct ctc aaa gtt caa ggc caa tca tct gga tca gta ctt    96
Asp Ala Ala Pro Leu Lys Val Gln Gly Gln Ser Ser Gly Ser Val Leu
            20                  25                  30

ccc tat gtg ggt gta gct tgt ctg gga gca att tta ttt gga tat cac   144
Pro Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His
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cta ggg gtg gtg aat ggt gcc ctt gag tac cta gct aag gat ctt gga    192
Leu Gly Val Val Asn Gly Ala Leu Glu Tyr Leu Ala Lys Asp Leu Gly
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att gcc gag aac act gtt ata caa gga tgg att gtt agc aca gtt ctt    240
Ile Ala Glu Asn Thr Val Ile Gln Gly Trp Ile Val Ser Thr Val Leu
65                  70                  75                  80

gct ggc gcc ttt gtt ggt tca ttt act ggt gga gtt ctg gct gat aaa    288
Ala Gly Ala Phe Val Gly Ser Phe Thr Gly Gly Val Leu Ala Asp Lys
                85                  90                  95

ttt ggc cga aca aag aca ttt ata ttg gat gca att cca ctt tca gtt    336
Phe Gly Arg Thr Lys Thr Phe Ile Leu Asp Ala Ile Pro Leu Ser Val
            100                 105                 110

ggt gcg ttt cta tgt acc act gcc cag agt gtt cag gct atg atc att    384
Gly Ala Phe Leu Cys Thr Thr Ala Gln Ser Val Gln Ala Met Ile Ile
        115                 120                 125

gga cgc tta ctt act gga att ggc att ggc atc tca tct gct att gtg    432
Gly Arg Leu Leu Thr Gly Ile Gly Ile Gly Ile Ser Ser Ala Ile Val
    130                 135                 140

cca ctt tac ata tct gag atc tca ccc act gaa att cgc ggc aca ctg    480
Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Thr Leu
145                 150                 155                 160

gga acg gtc aat cag cta ttc att tgc att gga att ctt gtt gca ctc    528
Gly Thr Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Val Ala Leu
                165                 170                 175

gtg gtt gga ttg cct ttg tct gga aat cct tcg tgg tgg aga aca atg    576
Val Val Gly Leu Pro Leu Ser Gly Asn Pro Ser Trp Trp Arg Thr Met
            180                 185                 190

ttt ggt ctc gca ctt att cca tct gtt tta ctt gca ata gga atg gca    624
Phe Gly Leu Ala Leu Ile Pro Ser Val Leu Leu Ala Ile Gly Met Ala
        195                 200                 205

ttt tct cct gaa agt cct cgg tgg ctc tat cag caa ggg aga att tct    672
Phe Ser Pro Glu Ser Pro Arg Trp Leu Tyr Gln Gln Gly Arg Ile Ser
    210                 215                 220

gaa gct gag aca tct att aaa agg cta tat ggt aaa gaa aaa gtt gct    720
Glu Ala Glu Thr Ser Ile Lys Arg Leu Tyr Gly Lys Glu Lys Val Ala
225                 230                 235                 240

gag gtt atg ggt gac ttg gaa gct tct gcc cgg ggt tct tca gaa cca    768
Glu Val Met Gly Asp Leu Glu Ala Ser Ala Arg Gly Ser Ser Glu Pro
            245                 250                 255

gat gct ggg tgg ctt gat cta ttt agt agc cgt tat agg aaa gtt gtt    816
Asp Ala Gly Trp Leu Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val
            260                 265                 270

agc att ggt gca gct atg ttc ttg ttg cag cag ttg gct ggg ata aat    864
Ser Ile Gly Ala Ala Met Phe Leu Leu Gln Gln Leu Ala Gly Ile Asn
    275                 280                 285

gct gtt gtc tat tat tcc act gcc gtg ttc cgg agt gct gga att aca    912
Ala Val Val Tyr Tyr Ser Thr Ala Val Phe Arg Ser Ala Gly Ile Thr
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Ala Val Val Tyr Tyr Ser Thr Ala Val Phe Arg Ser Ala Gly Ile Thr
    290                 295                 300

tct gat gta gca gcc agt gct ctg gtt gga gca gcc aac gtc ttt ggg      960
Ser Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ala Asn Val Phe Gly
305                 310                 315                 320

aca acg gtg gca tcc tct ttg atg gac aaa caa gga agg aag agt ctc     1008
Thr Thr Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu
                325                 330                 335

ttg ctc ata agc tat act gga atg gct gca tca atg atg ttg ctt tcc     1056
Leu Leu Ile Ser Tyr Thr Gly Met Ala Ala Ser Met Met Leu Leu Ser
                340                 345                 350

ttg tca ttc act tgg aag gtc ctg act cca tat tct ggc aca ctg gct     1104
Leu Ser Phe Thr Trp Lys Val Leu Thr Pro Tyr Ser Gly Thr Leu Ala
            355                 360                 365

gtt ctt ggt act gtc ctc tat gtg ttg tcc ttt tca ctt ggt gct ggt     1152
Val Leu Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly
    370                 375                 380

cct gtg cct gct ctt cta ctt cca gaa ata ttt gct tcc aga att agg     1200
Pro Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg
385                 390                 395                 400

gca aaa gcg gtg gct ctc tct ttg ggg gta cat tgg ata atg aac ttc     1248
Ala Lys Ala Val Ala Leu Ser Leu Gly Val His Trp Ile Met Asn Phe
                405                 410                 415

ttt att ggc ctg tac ttc ttg agc att gta act aaa ttt ggt atc agt     1296
Phe Ile Gly Leu Tyr Phe Leu Ser Ile Val Thr Lys Phe Gly Ile Ser
                420                 425                 430

acg gtg tac atg gga ttt gca ctc tct tgt ctt gtt gct gtc gtg tat     1344
Thr Val Tyr Met Gly Phe Ala Leu Ser Cys Leu Val Ala Val Val Tyr
            435                 440                 445

ata act ggt aat gtc gtg gag aca aag ggg cgg tca ctg gag gag ata     1392
Ile Thr Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile
    450                 455                 460

gaa cgt gag tta agt cca gca att tga gtggtacaac atgaacagct            1439
Glu Arg Glu Leu Ser Pro Ala Ile
465                 470

gagagtaatt tcagattccg ccatccagtg ggtcttgatt ttgaagagat tctccacatt  1499

gggagttcta ttattgcgag actggagttg catcacttac cctttagcta tctctttgat  1559

tttcttgtac gtcggcatca tgaatcatgg aacattgtaa aaacatgtaa ctgttatgga  1619

agatgatccg cgtatgattg agtatttcaa aaaa                               1653


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Pro Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His
             35                  40                  45

Leu Gly Val Val Asn Gly Ala Leu Glu Tyr Leu Ala Lys Asp Leu Gly
         50                  55                  60

Ile Ala Glu Asn Thr Val Ile Gln Gly Trp Ile Val Ser Thr Val Leu
65                  70                  75                      80

Ala Gly Ala Phe Val Gly Ser Phe Thr Gly Gly Val Leu Ala Asp Lys
                 85                  90                  95

Phe Gly Arg Thr Lys Thr Phe Ile Leu Asp Ala Ile Pro Leu Ser Val
             100                 105                 110

Gly Ala Phe Leu Cys Thr Thr Ala Gln Ser Val Gln Ala Met Ile Ile
         115                 120                 125

Gly Arg Leu Leu Thr Gly Ile Gly Ile Gly Ile Ser Ser Ala Ile Val
         130                 135                 140

Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Thr Leu
145                 150                 155                 160

Gly Thr Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Val Ala Leu
                 165                 170                 175

Val Val Gly Leu Pro Leu Ser Gly Asn Pro Ser Trp Trp Arg Thr Met
             180                 185                 190

Phe Gly Leu Ala Leu Ile Pro Ser Val Leu Leu Ala Ile Gly Met Ala
         195                 200                 205

Phe Ser Pro Glu Ser Pro Arg Trp Leu Tyr Gln Gln Gly Arg Ile Ser
         210                 215                 220

Glu Ala Glu Thr Ser Ile Lys Arg Leu Tyr Gly Lys Glu Lys Val Ala
225                 230                 235                 240

Glu Val Met Gly Asp Leu Glu Ala Ser Ala Arg Gly Ser Ser Glu Pro
             245                 250                 255

Asp Ala Gly Trp Leu Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val
             260                 265                 270

Ser Ile Gly Ala Ala Met Phe Leu Leu Gln Gln Leu Ala Gly Ile Asn
         275                 280                 285

Ala Val Val Tyr Tyr Ser Thr Ala Val Phe Arg Ser Ala Gly Ile Thr
         290                 295                 300

Ser Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ala Asn Val Phe Gly
305                 310                 315                 320

Thr Thr Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu
             325                 330                 335

Leu Leu Ile Ser Tyr Thr Gly Met Ala Ala Ser Met Met Leu Leu Ser
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              340                    345                    350

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    Val Leu Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly
            370                    375                    380

    Pro Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg
    385                    390                    395                    400

    Ala Lys Ala Val Ala Leu Ser Leu Gly Val His Trp Ile Met Asn Phe
                        405                    410                    415

    Phe Ile Gly Leu Tyr Phe Leu Ser Ile Val Thr Lys Phe Gly Ile Ser
                420                    425                    430

    Thr Val Tyr Met Gly Phe Ala Leu Ser Cys Leu Val Ala Val Val Tyr
            435                    440                    445

    Ile Thr Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile
        450                    455                    460

    Glu Arg Glu Leu Ser Pro Ala Ile
    465                    470



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    <213> Spinacia oleracea

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    atg cag gcg tca act ttt atg gtc aaa ggc aat ttg ggt ttt gaa gtt  108
    Met Gln Ala Ser Thr Phe Met Val Lys Gly Asn Leu Gly Phe Glu Val
     1               5                  10                  15

    cag aac cgt aga gtg gct ggg ctt gct ggg ttg aaa ggg tta agc tca  156
    Gln Asn Arg Arg Val Ala Gly Leu Ala Gly Leu Lys Gly Leu Ser Ser
                20                  25                  30

    atc cgt tcc aat aat cta agt ttt gtg aat gtt aat gac aat aat tat  204
    Ile Arg Ser Asn Asn Leu Ser Phe Val Asn Val Asn Asp Asn Asn Tyr
            35                  40                  45

    aag tct aat ccc tgt aaa ttg agt tgt ggg tcc ctt tcg atg ggt gct  252
    Lys Ser Asn Pro Cys Lys Leu Ser Cys Gly Ser Leu Ser Met Gly Ala
        50                  55                  60
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gga ttt gca aga ttg ggt ctt gat cat gtc atg aag tcc tca ccc aag    300
Gly Phe Ala Arg Leu Gly Leu Asp His Val Met Lys Ser Ser Pro Lys
 65              70              75              80

tac aga tca gtc aag gct caa gct gct tct gga gga gat ctt gaa gat    348
Tyr Arg Ser Val Lys Ala Gln Ala Ala Ser Gly Gly Asp Leu Glu Asp
                85              90              95

gcc act cct gtc aaa tat caa ggc aaa tct tct gca tca gtg ttg ccg    396
Ala Thr Pro Val Lys Tyr Gln Gly Lys Ser Ser Ala Ser Val Leu Pro
            100             105             110

tat gtt ggt gtt gct tgt ttg gga gct att ttg ttt gga tat cac ctt    444
Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His Leu
            115             120             125

ggt gtg gta aat gga gct ctt gac tac cta tct gcg gat tta gct att    492
Gly Val Val Asn Gly Ala Leu Asp Tyr Leu Ser Ala Asp Leu Ala Ile
        130             135             140

gct ggc aat act gtt tta caa gga tgg gtt gtg agc ata tta ctt gct    540
Ala Gly Asn Thr Val Leu Gln Gly Trp Val Val Ser Ile Leu Leu Ala
145             150             155             160

gga gcg act gta ggt tca ttt act ggc gga tct ttg gct gat aag ttt    588
Gly Ala Thr Val Gly Ser Phe Thr Gly Gly Ser Leu Ala Asp Lys Phe
            165             170             175

gga agg aca aag acc ttc cag tta gat gca att cct ctt gca ata gga    636
Gly Arg Thr Lys Thr Phe Gln Leu Asp Ala Ile Pro Leu Ala Ile Gly
            180             185             190

gct tat ctc tgt gcc aca gca caa aat gta cag ata atg atg att ggt    684
Ala Tyr Leu Cys Ala Thr Ala Gln Asn Val Gln Ile Met Met Ile Gly
        195             200             205

cgt tta ctt tgt ggc att gga att ggc ata tca tct gcc tta gtt ccg    732
Arg Leu Leu Cys Gly Ile Gly Ile Gly Ile Ser Ser Ala Leu Val Pro
        210             215             220

tta tac att tct gag att tcg cca act gaa att cga ggt gca ctt ggt    780
Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Ala Leu Gly
225             230             235             240

tct gtc aac cag ctt ttt ata tgc att ggt att ctt gcg gct ttg gtt    828
Ser Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Ala Ala Leu Val
            245             250             255

gct gga ttg cct tta gca gga aac cct ttg tgg tgg agg aca atg ttt    876
Ala Gly Leu Pro Leu Ala Gly Asn Pro Leu Trp Trp Arg Thr Met Phe
            260             265             270

ggt att gca aca gtt ccc tct gtt ctc ttg gct ctt ggg atg ggc ttc    924
Gly Ile Ala Thr Val Pro Ser Val Leu Leu Ala Leu Gly Met Gly Phe
            275             280             285

tgt cca gaa agc cct agg tgg ctt ttt cag caa gga aaa att gtt gaa    972
Cys Pro Glu Ser Pro Arg Trp Leu Phe Gln Gln Gly Lys Ile Val Glu
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gca gaa aag gcc gta gca gcc ctc tat gga aaa gaa agg gtt ccg gag    1020
Ala Glu Lys Ala Val Ala Ala Leu Tyr Gly Lys Glu Arg Val Pro Glu
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gtg att aat gat ttg aga gca tct gtt caa ggt tct tct gaa cca gaa   1068
Val Ile Asn Asp Leu Arg Ala Ser Val Gln Gly Ser Ser Glu Pro Glu
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gct ggc tgg ttt gat ctg ttc agt agc cgc tac agg aaa gtg gta agt   1116
Ala Gly Trp Phe Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val Ser
            340                345                350

gtt ggt gct gca ctt ttc ttg ttc cag caa atg gca gga atc aat gct   1164
Val Gly Ala Ala Leu Phe Leu Phe Gln Gln Met Ala Gly Ile Asn Ala
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gtt gta tat tac tcc aca tct gta ttc cga agt gct gga att gca tca   1212
Val Val Tyr Tyr Ser Thr Ser Val Phe Arg Ser Ala Gly Ile Ala Ser
    ·370                375                380

gat gtt gcc gct agt gcc ctt gtt gga gca tca aat gtt att ggc act   1260
Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ser Asn Val Ile Gly Thr
385                390                395                400

gct gtc gcc tct tct tta atg gac aag caa gga aga aag agc cta ctg   1308
Ala Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu Leu
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atg aca agt ttc tca gga atg gct gcc tca atg ttg ttg ctg tca cta   1356
Met Thr Ser Phe Ser Gly Met Ala Ala Ser Met Leu Leu Leu Ser Leu
                420                425                430

tcg ttc aca tgg aag gct cta gca cct tac tcg ggc aca ctt gcc gtt   1404
Ser Phe Thr Trp Lys Ala Leu Ala Pro Tyr Ser Gly Thr Leu Ala Val
            435                440                445

gtg gga act gtt tta tat gtc ctt tcc ttt tca ctt ggc gct ggt cct   1452
Val Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly Pro
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gtt cct gct ctt cta ctt cca gag atc ttc gca tcc aga atc cga gca   1500
Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg Ala
465                470                475                480

aaa gca gtg gct ttg tca ctg gga atg cat tgg gcg tca aac ttc gta   1548
Lys Ala Val Ala Leu Ser Leu Gly Met His Trp Ala Ser Asn Phe Val
                485                490                495

att ggc ctt tat ttc tta agt gtg gtg acc aag ttt gga atc agc aaa   1596
Ile Gly Leu Tyr Phe Leu Ser Val Val Thr Lys Phe Gly Ile Ser Lys
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gtg tat ttg ggg ttc gcg tca gtg tgt gtg ctt gcc gtg ttg tac ata   1644
Val Tyr Leu Gly Phe Ala Ser Val Cys Val Leu Ala Val Leu Tyr Ile
            515                520                525

gct ggt aac gtt gtt gaa aca aaa gga cga tca ctt gag gaa ata gag   1692
Ala Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile Glu
    530                535                540

ctt gct cta agt cca gct gtt tag tttggaggat acagtttttc tgttttttg   1746
Leu Ala Leu Ser Pro Ala Val
545                550


atctatagag aattatgtta ataattcccg gatttaggag tttgatgcta gttttcatgc   1806
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tcgttggcac attcatgtcc agacagttgt actatcaatg tcagaaattc ctcgtgcc   1864

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Gln Asn Arg Arg Val Ala Gly Leu Ala Gly Leu Lys Gly Leu Ser Ser
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Ile Arg Ser Asn Asn Leu Ser Phe Val Asn Val Asn Asp Asn Asn Tyr
        35   40   45

Lys Ser Asn Pro Cys Lys Leu Ser Cys Gly Ser Leu Ser Met Gly Ala
    50   55   60

Gly Phe Ala Arg Leu Gly Leu Asp His Val Met Lys Ser Ser Pro Lys
65   70   75   80

Tyr Arg Ser Val Lys Ala Gln Ala Ala Ser Gly Gly Asp Leu Glu Asp
                85   90   95

Ala Thr Pro Val Lys Tyr Gln Gly Lys Ser Ser Ala Ser Val Leu Pro
            100   105   110

Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His Leu
            115   120   125

Gly Val Val Asn Gly Ala Leu Asp Tyr Leu Ser Ala Asp Leu Ala Ile
    130   135   140

Ala Gly Asn Thr Val Leu Gln Gly Trp Val Val Ser Ile Leu Leu Ala
145   150   155   160

Gly Ala Thr Val Gly Ser Phe Thr Gly Gly Ser Leu Ala Asp Lys Phe
                165   170   175

Gly Arg Thr Lys Thr Phe Gln Leu Asp Ala Ile Pro Leu Ala Ile Gly
            180   185   190

Ala Tyr Leu Cys Ala Thr Ala Gln Asn Val Gln Ile Met Met Ile Gly
            195   200   205

Arg Leu Leu Cys Gly Ile Gly Ile Gly Ile Ser Ser Ala Leu Val Pro
    210   215   220

Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Ala Leu Gly
225   230   235   240

Ser Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Ala Ala Leu Val
                245   250   255

Ala Gly Leu Pro Leu Ala Gly Asn Pro Leu Trp Trp Arg Thr Met Phe
            260   265   270

Gly Ile Ala Thr Val Pro Ser Val Leu Leu Ala Leu Gly Met Gly Phe
            275   280   285

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Cys Pro Glu Ser Pro Arg Trp Leu Phe Gln Gln Gly Lys Ile Val Glu
    290             295             300

Ala Glu Lys Ala Val Ala Ala Leu Tyr Gly Lys Glu Arg Val Pro Glu
305             310             315             320

Val Ile Asn Asp Leu Arg Ala Ser Val Gln Gly Ser Ser Glu Pro Glu
            325             330             335

Ala Gly Trp Phe Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val Ser
            340             345             350

Val Gly Ala Ala Leu Phe Leu Phe Gln Gln Met Ala Gly Ile Asn Ala
            355             360             365

Val Val Tyr Tyr Ser Thr Ser Val Phe Arg Ser Ala Gly Ile Ala Ser
    370             375             380

Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ser Asn Val Ile Gly Thr
385             390             395             400

Ala Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu Leu
            405             410             415

Met Thr Ser Phe Ser Gly Met Ala Ala Ser Met Leu Leu Leu Ser Leu
            420             425             430

Ser Phe Thr Trp Lys Ala Leu Ala Pro Tyr Ser Gly Thr Leu Ala Val
    435             440             445

Val Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly Pro
    450             455             460

Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg Ala
465             470             475             480

Lys Ala Val Ala Leu Ser Leu Gly Met His Trp Ala Ser Asn Phe Val
            485             490             495

Ile Gly Leu Tyr Phe Leu Ser Val Val Thr Lys Phe Gly Ile Ser Lys
            500             505             510

Val Tyr Leu Gly Phe Ala Ser Val Cys Val Leu Ala Val Leu Tyr Ile
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Ala Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile Glu
    530             535             540

Leu Ala Leu Ser Pro Ala Val
545             550
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